

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Dharmesh Jawarani Group Art Unit:
 Application No.: Examiner:
 Date Filed:
 Title: METHOD OF INHIBITING METAL SILICIDE ENCROACHMENT IN A
 TRANSISTOR

INFORMATION DISCLOSURE STATEMENT (IDS)

Commissioner For Patents
 Alexandria, VA 22313

SIR:

In accordance with 37 C.F.R. §1.56 and in compliance with 37 C.F.R. §§1.97 and 1.98, the references listed on attached Form PTO/SB/08 and/or subsequently identified herein, are for consideration by the United States Patent and Trademark Office. Pursuant to the Office waiving the requirement under 37 CFR 1.98 (a)(2)(i) for submitting a copy of each cited U.S. patent and each U.S. patent application publication for all U.S. national patent applications filed after June 30, 2003 and for all international applications that have entered the national stage under 35 USC §371 after June 30, 2003, copies of the reference are not submitted herewith.

I. COPIES

- a. ☒ A legible copy of (i) each foreign patent; (ii) each publication or that portion which caused it to be listed; and (iii) all other information or that portion which caused it to be listed, is included herewith.
- b. ☐ Any patents, publications or other information which are listed on PTO/SB/08 which are not enclosed herewith were previously cited by or submitted to the PTO in one of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. §120:

U.S. Serial Number

U.S. Filing Date

II. CONCISE EXPLANATION OF THE RELEVANCE (check at least one box)

- a. ☒ Except as may be indicated below in (b) of this section, all of the patents, publications or other information are in the English language (concise explanation not required).
- b. ☐ A concise explanation of the relevance of all patents, publications or other information listed that is not in the English language is as follows:
- c. ☐ The following additional information is provided for the Examiner's consideration:

III. ☐ CROSS REFERENCE TO RELATED APPLICATION(S)

The Examiner is advised that the following co-pending application(s) contain(s) subject matter that may be related to the present application. By bringing this (these) applications to the Examiner's attention, Applicant(s) does(do) not waive the confidentiality provisions of 35 U.S.C. §122.

Serial No.
 10/718,892

Filing Date
 November 21, 2003

Art Unit
 Unknown

FEES

- IV. ☒ **THIS IDS IS BEING FILED UNDER 37 C.F.R. §1.97(b):** (check one box)
- a. ☐ within three months of the filing date of a national application other than a continued prosecution application under § 1.53(d) (37 C.F.R. §1.97(b)(1)). No fee or statement is required.
 - b. ☐ within three months of the date of entry of the national stage as set forth in § 1.491 in an international application (37 C.F.R. §1.97(b)(2)). No fee or statement is required.
 - c. ☒ before the mailing date of a first Office Action on the merits (37 C.F.R. §1.97(b)(3)). No fee or statement is required.
 - d. ☐ before the mailing date of a first Office Action after the filing of a request for continued examination under § 1.114 (37 C.F.R. § 1.97(b)(4)). No fee or statement is required.
- V. ☐ **THIS IDS IS BEING FILED UNDER 37 C.F.R. §1.97(c):** (check one box)
before the mailing date of any of a Final Office Action under 37 C.F.R. §1.113, a Notice of Allowance under 37 C.F.R. §1.311, or an action that otherwise closes prosecution in the application (See 37 C.F.R. §1.97(c)).
- a. ☐ No statement; therefore, charge deposit account **502117, Motorola, Inc.** the fee set forth in 37 C.F.R. §1.17(p).
 - b. ☐ See the statement below. No fee is required.
- VI. ☐ **THIS IDS IS BEING FILED UNDER 37 C.F.R. §1.97(d):**
on or before payment of the issue fee and is accompanied by the following:
- 1) a statement under 37 C.F.R. §1.97(e) as provided below; and
 - 2) charge deposit account **502117** the petition fee set forth in §1.17(p).
- VII. ☐ **STATEMENT UNDER 37 C.F.R. §1.97(e)** (check only one box, if applicable)
The undersigned hereby states that
- a. ☐ each item of information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application not more than three months prior to the filing of IDS; or
 - b. ☐ no item of information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application, and to knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement, or
 - c. ☐ some of the items of information contained in the IDS were cited in a communication from a foreign Patent Office. As to this information, the undersigned states that each item of information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application not more than three months prior to the filing of this IDS. As to the remaining information, the undersigned hereby states that no item of this remaining information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application or, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement.

VIII. PAYMENT OF FEES

- ☐ A check in the amount of _____ is enclosed for the above-identified fee(s).
- ☐ Please charge Deposit Account **502117, Motorola, Inc.** in the amount of \$180.00 for the above-indicated fee(s).
- ☒ If Applicant has overlooked any additional fees, or if any overpayment has been made, the Commissioner is hereby authorized to credit or debit Deposit Account **502117, Motorola, Inc.**
- ☐ Two Copies of this paper are attached for Deposit Account charges and debits.

The above references are being cited only in the interests of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in a combination, to a person of ordinary skill in the art.

If the Examiner has any questions concerning this IDS, he/she is requested to contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule (with a petition if necessary) and charge the appropriate fee to Deposit Account No. **502117**.

Respectfully submitted,
Dharmesh Jawarani

Robert L. King
Robert L. King
Attorney for Applicant(s)
Reg. No. 30,185
Tel. (512) 996-6839

MOTOROLA, INC.
Customer Number 23125

Enclosures: ☒ PTO/SB/08
☒ References AA-AM
☐ Foreign Search Report
☐ Other:

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>			Complete if Known		
			Application Number		
			Filing Date		
			First Named Inventor Dharmesh Jawarani		
			Group Art Unit		
Examiner Name					
Sheet	1	of	2	Attorney Docket Number	SC13207TP

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number Number -Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US -			

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ Number ⁴ Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
	AA	WO 00/36634	06-22-2000	Bai et al.		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	AB	WIELUNSKI, L. et al.; "Alteration of Ni silicide formation by N implantation"; Applied Physics Letters; USA; 01-15-1981; pp 106-108; Vol. 38, No. 2; American Institute of Physics; USA.	
	AC	D'HEURLE, F. et al. ; "Diffusion in intermetallic compounds with the CaF ₂ structure: A marker study of the formation of NiSi ₂ thin films"; Journal of Applied Physics; August, 1982; pp 5678-5681; Vol. 53, No. 8; American Institute of Physics; USA.	
	AD	CHENG, L.W. et al.; "Effects of nitrogen ion implantation on the formation of nickel silicide contacts on shallow junctions"; Thin Solid Films; 1999; pp 412-416; Elsevier Science S.A..	

Examiner Signature		Date Considered	
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation, if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² Applicant is to place a check mark here if English Language Translation is attached.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				<i>Complete if Known</i>	
				Application Number	
				Filing Date	
				First Named Inventor	Dharmesh Jawarani
				Group Art Unit	
Examiner Name					
Sheet	2	of	2	Attorney Docket Number	SC13207TP

NON PATENT LITERATURE DOCUMENTS (cont.)					
	AE	LEE, P.S. et al.; "Improved NiSi Salicide Process using Presilicide N ₂ ⁺ Implant for MOSFETs"; IEEE Electron Device Letters; December, 2000; pp 566-568; IEEE.			
	AF	LEE, P.S. et al; "Nickel Silicide Formation on Si(100) and Poly-Si with a Presilicide N ₂ ⁺ Implantation"; Journal of Electronic Materials; 2001; pp 1554-1559; Vol. 30, No. 12; Electronic Materials; USA.			
	AG	CHAO, Tien-Sheng et al.; "Performance Improvement of Nickel Salicided n-Type Metal Oxide Semiconductor Field Effect Transistors by Nitrogen Implantation"; Jpn J. Appl Phys.; April 2002; pp L381-1383; Vol 41; The Japan Society of Applied Physics; Japan.			
	AH	LEE, P.S. et al; "Effect of Ion Implantation on Layer Inversion of Ni Silicided Polu-Si"; Journal of The Electrochemical Society; 2002; ppG505-509; The Electrochemical Society, Inc.			
	AI	CHOI, Chei-Jong et al; "Effects of Hydrogen Implantation on the Structural and Electrical Properties of Nickel Silicide"; Journal of The Electrochemical Society; 2002; pp G517-G521; The Electrochemical Society.			
	AJ	WONG, A.S.W. et al; "F-enhanced morphological and thermal stability of NiSi films onBF ₂ ⁺ -implanted Si(001); Applied Physics Letters; December 30, 2002; pp 5138-5140; Vol 81, No. 27; American Institute of Physics; USA.			
	AK	LAVOIE, C. et al.; "Towards implementation of a nickel silicide process for CMOS technologies"; Article in Press; 2003, pp 1-14; Elsevier B.V.			
	AL	OGHURO, T. et al.; "Nitrogen-doped Nickel Monosilicide Technique for Deep Submicron CMOS Salicide"; IEEE; 1995; pp 18.3.1-18.3.4.			
	AM	Related application 10/718,892 filed November 21, 2003			
Examiner Signature				Date Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation, if not in conformance and not considered. Include copy of this form with next communication to applicant.

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